

Appl. No. 10/069,031
Amdt. dated September 9, 2004
Reply to Office Action of June 16, 2004

AMENDMENTS TO THE CLAIMS

Original claims 1-39 were canceled and new claims 40-66 were presented therefor in the Preliminary Amendment filed July 5, 2002.

Please amend claims 40, 46, 48, 57, 64 and 65, as set forth in the following listing of the claims.

Claims 1-39 (canceled)

40. (currently amended) A method for the deposition of semiconductor layers comprising SiC and/or ~~SiC_xGe_{1-x} (x=0-1)~~ SiC_xGe_{1-x} (0≤x≤1), AlN, GaN ~~or related materials~~ by a CVD method, wherein:

at least one substrate is heated to a temperature of approximately 1100°C to approximately 1800°C;

the at least one substrate rotates in an actively heated flow channel reactor;

the coating takes place homoepitaxially or heteroepitaxially;

at least one process or carrier gases is introduced just ahead of the hot substrate;

the flow channel reactor is heated on all sides; and wherein

the one or more process or carrier gases, before being introduced, are actively cooled to a temperature which is well below process temperature, so that premature decomposition of process gases and/or local supersaturation of gas stream with a decomposition product is avoided.

41. (previously presented) The method according to claim 40, wherein the at least one substrate is disposed on at least one substrate holder plate, which is disposed in or on a substrate holder, and the at least substrate holder plate is driven relative to the substrate holder by "gas foil rotation".

42. (previously presented) The method according to claim 40, wherein silane (SiH_4) or other Si-containing inorganic and organic starting materials, germane (GeH_4) and propane (C_3H_8) or other hydrocarbon gases are used as the process gas(es).

43. (previously presented) The method according to claim 41, wherein by complete decomposition of source gases ahead of or above the at least one substrate, on account of a homogeneous temperature profile of the substrate holder, so that growth rates of 10 $\mu\text{m/h}$ or more are achieved for the SiC and/or $\text{SiC}_x\text{Ge}_{1-x}$ ($x=0-1$) semiconductor layers.

44. (previously presented) The method according to claim 40, wherein reduction of Si cluster and seed formation in the gas stream is achieved by low temperature gradients perpendicular to the at least one substrate.

45. (previously presented) The method according to claim 40, wherein the layers are deposited at process pressures of between 10-1000 mbar.

46. (currently amended) A device for producing semiconductor layers comprising SiC, ~~$\text{SiC}_x\text{Ge}_{1-x}$ ($x=0-1$)~~ $\text{SiC}_x\text{Ge}_{1-x}$ ($0 \leq x \leq 1$), AlN, GaN, ~~related materials with a wide electronic band gap and a high binding energy~~ by a vapor-phase application method particularly a CVD method, comprising:

a reactor chamber which has at least one gas inlet for reaction gases;

a rotatable substrate holder on which at least one substrate is disposed horizontally;

the gas inlet being disposed just ahead
of the substrate holder;

a gas outlet; and

a heater device which heats the
substrate holder and thereby surfaces of the substrate holder
which are to be coated, in a controlled manner to temperatures of
from 1100°C to 1800°C; and wherein

a wall region of the reactor chamber
which lies opposite the substrate surfaces which are to be coated
[[are]] is actively heatable to high temperatures; and

the gas inlet is coolable to a
temperature which is well below process temperature.

47. (previously presented) The device
according to claim 46, wherein the reactor chamber is constructed
in rotationally symmetrical form and has a central gas inlet and
a rotationally symmetrical gas outlet.

48. (currently amended) The device
according to claim 46, wherein boundary walls of the reactor
chamber which face reactor space, and at least one substrate
plate and/or at least one said substrate holder have a
continuous, inert coating, particularly comprising TaC, NbC, ~~and~~

~~the like,~~ which is able to withstand high temperatures of up to 1800°C and cannot be etched by hydrogen radicals.

49. (previously presented) The device according to claim 46, further comprising a turning device for rotation of the at least one substrate in each case on a substrate plate which is disposed in or on a substrate holder, by means of "gas foil rotation".

50. (previously presented) The device according to claim 46, further comprising a turning device for rotation of the at least one substrate in each case on a substrate plate, which is disposed in or on a substrate holder, by means of a mechanically driven shaft.

51. (previously presented) The device according to claim 46, further comprising at least one temperature control device for providing a uniform or different temperature to all boundary walls facing process gas, as top side, underside and side walls of a heated flow channel which is thereby closed off.

52. (previously presented) The device according to claim 46, further comprising a combination of high-frequency, lamp and resistance heating means for heating the

boundary walls which face process gas, and particularly the substrate holder.

53. (previously presented) The device according to claim 51, wherein separate control of temperature of a substrate-side boundary wall from an opposite boundary wall of the heated flow channel is effected by two separate heating circuits, each with a dedicated control means.

54. (previously presented) The device according to claim 51, wherein boundary walls, which face the process gas, of the heated flow channel, and particularly a substrate plate and/or the substrate holder, are made from a highly conductive material.

55. (previously presented) The device according to claim 51, wherein boundary walls, which face the process gas, of the heated flow channel, and particularly the substrate plate and/or the substrate holder, has a continuous, inert coating which is able to withstand high temperatures up to approximately 1800°C and cannot be etched by hydrogen radicals.

56. (previously presented) The device according to claim 46, further comprising a cooling device actively cools the gas inlet, up to just before a heated flow channel, with a liquid or gaseous medium.

57. (currently amended) The device according to claim 56, wherein the cool gas inlet is sealed with respect to the flow channel which is heated on all sides, sealing of the cool gas inlet being accomplished by means of a highly insulating, narrow adapter piece.

58. (previously presented) The device according to claim 46, wherein a flow channel, downstream of an actively heated zone, comprises outlet segments which have different inert materials.

59. (previously presented) The device according to claim 46, further comprising thin plates, compared to thickness of the substrate holder, of inert materials with a different electrical conductivity from the substrate holder are fitable on or in the substrate holder, in order to locally influence introduction of high frequency and thereby input of energy.

60. (previously presented) The device according to claim 54, wherein the boundary wall, which lies opposite the at least one substrate, of the heated flow channel is installed in a fixed position, at a defined distance from a substrate-side boundary of the heated flow channel, or is rotatably connected thereto.

61. (previously presented) The device according to claim 46, wherein a boundary wall, which lies opposite the at least one substrate, of a heated flow channel is actively coolable by a gaseous medium.

62. (previously presented) The device according to claim 46, wherein there are a plurality of said at least one substrate which are disposed horizontally adjacent each other.

63. (previously presented) The device according to claim 54, wherein the conductive material is graphite.

64. (currently amended) The device according to claim 55, wherein said inert coating is TaC, NbC~~and the like~~.

65. (currently amended) The device according to claim 58, wherein the different inert materials are TaC-coated graphite, SiC-coated graphite, quartz~~and the like~~.

66. (previously presented) The device according to claim 59, wherein the inert materials are Ta, Mo, W.